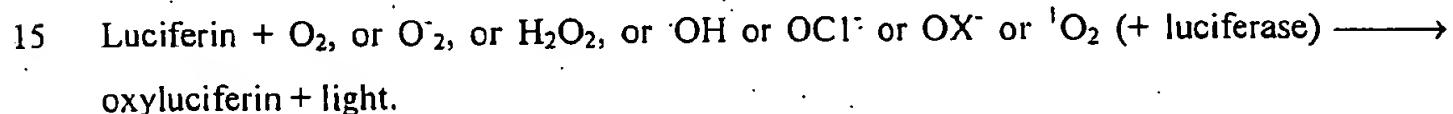




## PROTEIN AND DNA CODING THEREFOR

The present invention relates to a protein, capable of bioluminescence, cDNA coding therefor and their uses, *inter alia*, in diagnostics and therapy. In particular, this invention relates to the cloning and sequencing of cDNA coding for pholasin from the bivalve mollusc *Pholas dactylus*.

The term 'bioluminescence' refers to the emission of light resulting from a chemical reaction within, or produced by, a living organism. The essential components to the chemical reaction are: an organic molecule, usually comprising a luciferin; oxygen or one of its metabolites; and an enzyme or luciferase that catalyses the oxidation of the luciferin. The chemiluminescent reaction responsible for bioluminescence may be represented as follows:



Up to three other substances may also be required to generate light or to generate light of the required colour and intensity. These are as follows:

- 20
- (a) A cation, such as H<sup>+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup> or a transition metal cation (eg Cu<sup>+</sup>/Cu<sup>2+</sup>, Fe<sup>2+</sup>/Fe<sup>3+</sup>, La<sup>3+</sup> and V<sup>3+</sup>);
  - (b) A co-factor such as NAD(P)H, FMN or ATP; and/or
  - (c) A fluor as an energy transfer acceptor.

25 Five chemical families of luciferin are known:

- (a) Aldehydes (found in the freshwater limpet *Latia*, earthworms, and with FMN in bacteria);
- 30 (b) Imidazolopyrazines, which are the compounds most commonly responsible for bioluminescence in the sea (found in Sarcomastigophora, Cnidaria, Ctenophora, Annelida, Chaetognatha, some Arthropoda, some Mollusca and some Chordata);
- (c) Benzothiazoles (found in beetles such as fireflies and glow-worms);
- (d) Linear tetrapyrroles (found in dinoflagellates, euphausiid shrimp and some fish);

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5/24/2005